Did Logging Flood the Hayfield? Forest Practices on Mt. Rose Swanson near Armstrong, BC

Complaint Investigation 980199

FPB/IRC/26

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The Investigation

On June 3, 1999, the Board received a complaint from a couple who own property near Armstrong, in the Vernon Forest District. The complainants' land is on the slope of Mt. Rose Swanson and on the flat valley bottom below.

The complainants suspect that logging, which took place in 1996 on Crown land upslope of their 26 hectare hayfield, caused part of the field to become saturated with water, making it inaccessible to farm equipment. Consequently, the complainants lost hay crops in 1997 and 1998 and were forced to reduce their herd of cows, due to the crop loss.

Background

The watershed above the complainants' property is a 441 hectare mix of private and Crown land on Mt. Rose Swanson. Logging has taken place on the complainants' property, other privately owned land and Crown land. A number of old roads and trails cross the area.

Part of the complainants' property, immediately above their hayfield, was selectively logged about 15 years ago by a previous owner. The logged area is heavily disturbed with numerous trails and roads. John Brook is a small stream that used to flow down the slope in a defined channel. However, logging and agricultural activities over the years have obliterated the channel of the brook. The water now disperses across the slope and runs onto the hayfield at the base of the slope.

In the early 1990s, the Ministry of Forests asked Tolko Industries Limited (the licensee) to begin planning operations to address a severe root rot problem on Crown land on Mt. Rose Swanson above the complainant's property. In 1996, the ministry approved the licensee's forest development plan and that year Tolko clearcut approximately 75 hectares, in five cutblocks.

At about the same time the cutblocks were harvested, the complainants purchased the property. They took hay off the field that year. However, in 1997, they assert that they could not access part of the field because it was saturated with water. The complainants contacted the Vernon Forest District with their concerns.

In the fall of 1997, the ministry's regional hydrologist and regional geomorphologist visited the site at the request of the district. These specialists visited the site separately and each prepared a report. The specialists decided to view the site together during the summer, which they did in June 1998. Their observations and conclusions will be discussed in more detail later in this report.

According to the complainants, part of the field remained wet and inaccessible in 1998, and again in 1999. The complainants continued to pursue the matter with the ministry, but the ministry responded that it was not responsible. Dissatisfied with the ministry's position, the complainants filed a complaint with the Board in June 1999.

In July 1999, the Ministry of Agriculture, Fisheries and Food's provincial soil specialist visited the hayfield. He provided the complainants with a report describing the site and water movement, and he gave advice for improving the drainage of the field.

Board staff viewed the complainants' hayfield, the logging on Crown land and the logging on the complainant's private land in August 1999.

The Board investigation focused on whether the requirements of the Forest Practices Code were met, specifically:

- Did the public, including previous landowners, have an opportunity to comment on plans and were any concerns raised?
- Did the planning of these activities comply with the Code?
- Did logging and road upgrading in 1996 comply with the requirements of the Code?
- Did logging in 1996 cause the problem identified by the complainants?

Investigation Findings

A. Compliance with Code Requirements

The Opportunity to Review Plans

Section 39 of the *Forest Practices Code of British Columbia Act* (the Act) requires a licensee to make plans for logging and road construction available for public review and comment. The investigation considered whether the licensee provided an opportunity for the public to review and comment on the planned operations above the hayfield. The investigation also considered whether any comments were made about potential impacts on John Brook or other water-related concerns when the licensee was planning operations in the Mt. Rose Swanson area in 1995.

In May 1995, the licensee advertised the silviculture prescriptions for the cutblocks in the local newspaper. The silviculture prescriptions were also provided to the Fish and Wildlife and Water Management Branches of the Ministry of Environment, Lands and Parks, and two landowners. One landowner was the owner of the complainants' property at the time, and the other was a neighbor, who, coincidentally, had also previously owned the property.

A review of consultation records showed that the previous landowner was interested in obtaining access to the cutblocks for grazing his cattle, and he was concerned about fencing. There is no record of any concerns about logging, road construction or related water issues.

The neighbor did not bring any concerns about water to the attention of either the Ministry of Forests or the licensee. The Water Management Branch did not provide any comments on the proposed development, and the Fish and Wildlife Branch comments were about managing winter range for deer.

The licensee's 1996 forest development plan was made available for public review and comment between February 12 and May 15, 1996. No water-related concerns were raised during the opportunity to review and comment on the forest development plan.

Finding 1:

The licensee provided an opportunity to review and comment on the forest development plan to the public interested and affected by operations, in accordance with Code requirements. Members of the public, including two previous owners of the complainants' property, and the Ministry of Environment, Lands and Parks did not raise any concerns related to water during the opportunity to review and comment on harvesting plans.[1]

Watershed Assessment

The complainants believe that the licensee should have conducted a watershed assessment when harvesting was planned. A watershed assessment is an analytical procedure that helps forest managers understand the type and extent of water-related problems that may exist in a watershed. A watershed assessment identifies possible hydrological implications of proposed forestry activities.

At the time harvesting was planned in 1996, section 32[2] of the *Operational Planning Regulation* set out the requirements for a watershed assessment. A watershed assessment must be carried out before a forest development plan is made available for public review if the watershed is:

> (a) a community watershed;
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> (b) a watershed that has significant downstream fisheries values or licensed domestic water users and significant watershed sensitivity as determined by the district manager and a designated environment official;
>
> (c) a watershed for which the district manager determines an assessment is necessary.

In this case, John Brook was not a community watershed. Furthermore, there were no significant downstream fisheries values or licensed domestic water users and the district manager and a designated environment official had not identified any significant watershed sensitivity. Finally, the district manager did not determine that a watershed assessment was necessary. Therefore, the licensee did not have to conduct a watershed assessment for John Brook.

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[1] The neighbor raised concerns about increased runoff with the local council in October 1996, however harvesting was already complete.

[2] A similar requirement is currently in effect (O.P.R. s. 14(1))

Finding 2:

The Code did not require a watershed assessment before the harvesting was approved in 1996.

Although the Code did not require a watershed assessment, the investigation considered whether there were indications of potential impacts that should have led the district manager to determine that one was necessary.

At the time, the *Interior Watershed Assessment Guidebook*[3] provided guidance about watershed assessments. The guidebook is not law. However, it describes procedures, practices and results that are consistent with the requirements of the Code. The district manager stated that he considered the guidebook when he considered the proposed cutblocks and roads in the watershed.

The guidebook[4] stated that watershed assessments would be "best applied where the potential for cumulative impacts exist. Watersheds with this potential include those in which forest development is proposed for the next 5-year period, and in which:

- at least 20 percent of the watershed's area will have been logged during the past 25 years (including the five years of the proposed development plan)
- a significant number of landslides are known to have occurred
- stream channel stability problems are evident."

The guidebook suggests that watershed assessments would be most suitable for watersheds between five and 500 square kilometres. The guidebook also recognizes that there are more candidate watersheds that could be assessed than there are resources to do so. The guidebook recommends careful prioritization of watersheds for assessment.

The district manager considered that logging had taken place on 17 percent of the watershed in the 20 years before 1996. The proposed logging would result in an additional 12 percent of the watershed being harvested. After logging was completed, 29 percent of the watershed area would have been harvested in a 25-year period. He knew that no significant landslides had occurred in the watershed and there were no concerns with stream channel stability. He knew that the watershed was 4.4 square kilometres, which was smaller than the minimum size recommended by the guidebook.

Although the proposed harvesting would result in more than 20 percent of the John Brook watershed being harvested in a 25-year period, the other guidebook criteria did not suggest that an assessment should be undertaken. Consequently, the district manager did not determine that a watershed assessment procedure was necessary. In the Board's opinion, this interpretation was consistent with the guidebook.

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[3] The guidebook was updated and combined with the *Coastal Watershed Assessment Guidebook* on April 1, 1999, and is now entitled *Coastal Watershed Assessment Procedure Guidebook* (CWAP) *Interior Watershed Assessment Guidebook* (IWAP) – 1999.

[4] Page 2.

The district manager was also aware that the Ministry of Environment, Lands and Parks, the public and two previous landowners did not raise any water-related concerns before the forest development plan was approved. He also knew that the requirements of section 32 of the *Operational Planning Regulation* did not apply.

Based on the information considered by the district manager, the lack of landslides or evidence of channel stability problems and the lack of concern on the part of the public and the Ministry of Environment, Lands and Parks, it was reasonable for the district manager not to require the licensee to prepare a watershed assessment before planning the five cutblocks in the watershed.

Finding 3:

The district manager's actions were consistent with the *Interior Watershed Assessment Guidebook*. It was reasonable for the district manager not to require a watershed assessment for the watershed.

During the field investigation, the complainants pointed out a culvert that they felt was directing water from the adjacent watershed into the John Brook watershed. According to the complainant, the effect of the culvert was to increase the area of the John Brook watershed above the five square kilometre size specified as a minimum in the guidebook.

Board staff does not agree that the culvert is directing water from the adjacent watershed into the John Brook watershed. However, if it were, the culvert would not have the effect of increasing the size of the watershed for assessment purposes. If the culvert does not maintain existing surface drainage patterns, the situation should be rectified.

Forest Practices

Board staff also investigated whether there were indications that the licensees' forest practices on Crown land in 1996 were inconsistent with Code requirements, and whether those practices had altered the drainage of the area.

To access four of the cutblocks, the licensee upgraded existing roads. Private roads were used to access the fifth cutblock.

The road upgrades were minor, since the roads had been in place for years. Gravel was placed on the road surface and culverts were installed where necessary. After harvesting was completed, the roads were temporarily deactivated[5], in accordance with the forest development plan. There is no evidence that the road work and subsequent deactivation in 1996 altered the existing surface drainage patterns of the area.

The cutblocks are located on relatively flat areas and are now covered with grass and young regeneration. There is no evidence that the activities within the cutblocks altered existing surface drainage patterns, and there is no evidence of any contravention of Code requirements.

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[5] Culverts were removed and waterbars were constructed.

Finding 4:

Forest practices associated with the cutblocks in 1996 were carried out in accordance with Code requirements. There is no evidence that forest practices altered existing surface drainage.

B. Did logging of the five cutblocks on Crown land in 1996 cause the problem identified by the complainants?

The complainants believe that the logging of the five cutblocks on Crown land in 1996 altered the drainage of their field because the previous owner assured them that there had never been a problem with the drainage of the field before that logging took place in 1996.

To determine whether logging of the five cutblocks on Crown land in 1996 altered the drainage of the hayfield, the investigation first considered these two questions:

- What factors affect the hydrology of the watershed and the hayfield?
- If the field became wetter after logging in 1996, what factors may have contributed?

Four specialists who visited the site after the cutblocks were logged considered both of these questions. The Ministry of Forests' regional hydrologist visited the site on November 13, 1997. The ministry's regional geomorphologist visited the site on December 10, 1997. Both returned together on June 22, 1998. They prepared a total of three reports. The Ministry of Agriculture, Fisheries and Food's provincial soil specialist also visited the property and prepared a report. A consulting professional hydrologist also visited the site in the early summer of 1998 at the request of the complainants. He did not prepare a report. However he discussed his observations with Board staff.

Factors affecting the hydrology of the watershed and the hayfield.

Geology

The four specialists who visited the site agree that the complainants' house and hayfield are located on a geological feature known as a fluvial fan. This means that water flowing down the original course of John Brook transported sediment and deposited it in a fan-shaped pattern as it reached the flat valley bottom and lost momentum. The fan is situated on top of an ancient lakebed, or bench, made up of clay or silty-clay. Groundwater flows more easily through the coarse materials of the fan than the relatively impermeable clay bench. The complainants' hayfield is, and has long been, a natural water-receiving site with restricted drainage.

Aerial photographs confirm that the hayfield receives water from the slope above. Photos from 1984 and 1994 showed a wet area in the same location as was observed during the field investigation in August 1999. The photos also show stream-like patterns of water in the vegetation covering the field. The provincial soil specialist noted these patterns on the ground during his visit in July 1999. He also observed water flowing on the surface of the ground.

Precipitation

The Ministry of Forests' geomorphologist attributed the main cause of the apparent increase in water levels in the hayfield to above-average precipitation in 1996 and particularly in 1997. He stated that the increase might have been too much for the local hydrologic system to handle, with the effects being noticed where water collects in the valley bottoms.

According to Environment Canada[6], the regional precipitation has been above average during the period since the complainants bought their property. In particular, 1996 was the third wettest year since 1948. The provincial soil specialist noted that 1998 was also a very moist year. The consulting hydrologist stated that precipitation between the fall of 1995 and the spring of 1997 was, in his experience, much greater than normal for the Okanagan Valley. The spring of 1997 was particularly wet.

Above average precipitation from the fall of 1995 to the spring of 1998 may have contributed to the wet condition of the field.

Removal of Forest Cover in the Watershed

The removal of forest cover through harvesting can have an impact on annual water yield and peak flows from a particular watershed. The geomorphologist stated that harvesting on and above the complainants' property would likely cause earlier peaks in water discharge from the slope as well as increased annual water yield. Harvesting above the complainants' property includes both private and Crown land harvesting.

The regional hydrologist also expected earlier peaks in water discharge from the slope as well as increased annual water yield due to forest removal.

The consulting hydrologist stated that the cutblocks on both private and Crown land are probably increasing the water yield of the watershed during the summer and fall. This increase in water may not allow water levels to subside as quickly as they may have in the past.

Diversion of Water by Roads

The geomorphologist stated that a likely source of increased water levels was water diversion by numerous roads in the harvested areas on the complainants' property. The result of the diversions is that water flows more rapidly downhill as surface flow rather than groundwater. The regional hydrologist agreed.

In one location, both the regional hydrologist and the geomorphologist noticed that a road appeared to be capturing water that naturally flowed east, and redirecting it south. The geomorphologist stated that redirection of the water back into the natural course may lower water flow to the complainants' property.

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[6] Regional Precipitation Departures Table, available on the internet at: http://www1.tor.ec.gc.ca/ccrm/bulletin/annual98/ptabrgfu.htm

The regional hydrologist noted that water appeared to have "been diverted from that portion of the slope which would previously have drained onto the adjacent property." The diverted water appeared to flow toward the hayfield.

Finding 5:

The hydrology of the watershed and the drainage of the hayfield has been affected by geology, increased precipitation, the removal of forest cover on both Crown and private land and the diversion of water by roads.

If the condition of the field worsened after logging in 1996, what factors may have contributed?

The geology of the watershed did not change after 1996. The roads and trails on the complainant's property, Crown land and other private property were built before the logging in 1996 on Crown land. Thus, the effect of water diversion by roads was the same both before and after logging in 1996.

As the roads did not change, the only factors that could have affected a change in the hydrology of the watershed after the cutblocks were logged in 1996 were increased precipitation and the removal of forest cover on the five cutblocks.

Finding 6:

Increased precipitation and the removal of forest cover on the five cutblocks could have contributed to a change in the condition of the hayfield after logging in 1996.

Did logging and road upgrading in 1996 alter the drainage of the hayfield?

As stated above, the specialists concluded that a number of factors affect the hydrology of the watershed and the hayfield. The regional hydrologist stated:

> Determination of how much of an effect any potential forest removal or diversion related increases in water flow to the (complainants') property have had on the level of saturation in their field is impossible for me to estimate.

The regional geomorphologist stated that "there are several possible reasons for the increase in water levels to the property."

The consulting hydrologist told the Board that it would be very difficult to quantify or attribute any increase in water yield to a specific cutblock in this situation due to the number of contributing factors.

The Board agrees with the specialists. There are simply too many complicating factors, including precipitation, sub-surface processes, and the presence of other cutblocks on both Crown and private land, including the complainants' property. Logging and road upgrading on the five cutblocks in 1996 cannot be isolated as the cause of the problem identified by the complainants.

Finding 7:

Logging and minor road work on five cutblocks on Crown land in 1996 cannot be isolated as the cause of the problem identified by the complainants.

Conclusions

The licensee planned and carried out forest practices in the Mt. Rose Swanson area in accordance with the requirements of the Forest Practices Code.

The Code did not require a watershed assessment, and it was reasonable for the district manager not to require one.

The hydrology of the John Brook watershed and the restricted drainage of the complainants' hayfield naturally causes a situation where water from the slope runs onto the field and creates wet conditions. Over the years, this natural situation has been affected by precipitation, the removal of forest cover from the complainants' property, other private land and Crown land and the diversion of water by roads. Increased precipitation between 1996 and early 1998 and the logging of five cutblocks has likely contributed to wetter conditions since 1996. However, the incremental effect of logging and road construction on the five cutblocks on Crown land in 1996 cannot be isolated as the single or most important cause of the problem identified by the complainants. There are simply too many complicating factors.

The Ministry of Forests' regional geomorphologist and the regional hydrologist made two recommendations in their final report, which they felt might improve the situation:

1. The road leading from the complainants' property off to the north should be either completely deactivated or heavily cross drained in order to re-disperse water across the slope.
2. Any water which has been diverted toward the slope above the property should be re-directed towards its original path away from the slope above the property.

The Board suggests that the complainant and the district manager review these recommendations and discuss their implementation.

The single person panel of the Board that concluded this report was Keith Moore.

Mount Rose Swanson